## REMARKS

In the March 12, 2009 Office Action[1], the Examiner:

- Objected to the Drawings;
- Rejected claims 1-12 and 14-19 under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent Application No. JP 2003-39215 to Nakazawa et al. ("Nakazawa"); and
- Rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Nakazawa in view of Japanese Patent Application No. 09-255702 to Tajima et al. ("Tajima").

By the present Applicants amend the specification. Claims 1-19 remain pending.

### Objection to the Drawings

On page 2 of the Office Action the Examiner objected to the drawings stating that "reference character '74' has been used to designate both 'anchoring piece . . . and 'stopper piece'." Applicants have amended the specification to ensure that reference character 74 is used to refer to the "anchoring piece." Accordingly, Applicants respectfully request withdrawal of the objection to the drawings.

### Rejection under 35 U.S.C. § 102(b)

In the Office Action, the Examiner rejected claims 1-12 and 14-19 under 35 U.S.C. § 102(b) as being anticipated by Nakazawa. Office Action at 2. Applicants respectfully traverse the rejection of claims 1-12 and 14-19 because Nakazawa does not teach or suggest each and every element of claim 1. Nakazawa simply does not disclose or suggest at least Applicants' claimed "a pressing member disposed near said front face of said carrying member and movable relative to said carrying member and

[1] The Office Action contains a number of statements reflecting characterization of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement or characterization in the Office Action.

**able to make a relative linear motion along said guiding axis relative to said guide bush**, the pressing member causing an elastic displacement in said radial direction on said material support section **by said relative linear motion**" and "a feed screw structure **causing said relative linear motion between said pressing member and said guide bush** by a mutual screwing motion of threads," (emphasis added) as recited in claim 1.

On page 3 of the Office Action, the Examiner alleges that tightening nut 30 of Nakazawa constitutes the claimed "pressing member," receiving member 40 of Nakazawa constitutes the claimed "carrying member," and collet 10 of Nakazawa constitutes the claimed "guide bush." Even assuming that such a characterization of Nakazawa is accurate, which Applicants do not concede, Nakazawa still does not disclose "a pressing member . . . able to make a relative linear motion along said guiding axis relative to said guide bush," as recited in claim 1. This is because tightening nut 30 of Nakazawa does **not** make relative linear motion relative to collet 10 such that its causes "an elastic displacement in said radial direction on said material support section by said relative linear motion."

Moreover, threaded portion 44a of Nakazawa does not constitute Applicant's claimed "feed screw structure," because threaded portion 44a does not cause "linear motion" between tightening nut 30 and collet 10. Instead, in Nakazawa collet 10 is moved together with tightening nut 30 relative to receiving member 40 so as to cause elastic displacement in a radial direction on a material support section of collet 10.

Therefore, Nakazawa does not teach or suggest "a pressing member . . . able to make a relative linear motion along said guiding axis relative to said guide bush, the

pressing member causing an elastic displacement in said radial direction on said material support section by said relative linear motion" and "a feed screw structure causing said relative linear motion between said pressing member and said guide bush by a mutual screwing motion of threads," as recited in claim 1. Thus, claim 1 is allowable for at least this reason.

Independent claim 18, while of different scope than claim 1, recites features similar to those of claim 1 and is thus allowable over Nakazawa for at least the same reasons discussed above in regard to claim 1. Claims 2-12, 14-17, and 19 are also allowable at least due to their dependence from one of the independent claims 1.

Accordingly, for at least the above-noted reasons, Applicants request withdrawal of the 35 U.S.C. § 102(b) rejection of claims 1-12 and 14-19.

**Rejection under 35 U.S.C. § 103(a)**

Applicant respectfully traverses the rejection of claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Nakazawa in view of Tajima because a prima facie case of obviousness has not been established with respect to the claim.

Claim 13 depends from claim 1 and therefore includes the features of claim 1. As discussed above, Nakazawa does not teach or suggest the features of claim 1. In addition, Tajima fails to cure the above-noted deficiencies of Nakazawa.

Thus, claim 13 is allowable over the cited references and Applicants request withdrawal of the 35 U.S.C. § 103(a) rejection of these claims.

**Conclusion**

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: July 13, 2009

By: _____
John M. Romary
Reg. No. 26,331

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* NOTICES *



1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the collet for supporting or grasping a cylindrical raw material, and guide pin bushing using this.
[0002]
[Description of the Prior Art]In the automatic lathe generally cut while rotating a cylindrical raw material, it has near the byte guide pin bushing which supports a cylindrical raw material slidably to the shaft orientations for deflection prevention of a cylindrical raw material. As shown in drawing 6, this guide pin bushing 80 is arranged between the byte 94 and the principal axis 92, and it is constituted so that it may support, where the cylindrical raw material 90 sent from the principal axis 92 is inserted in. The guide pin bushing 80 comprises the collet 82, the collet accommodation material 86, and the clamping screw 84, and is attached to the frame 88 of an automatic lathe.
[0003]it is shown in drawing 7 -- as -- this collet 82 -- hollow -- it is extended from the axial direction tip towards the end to the axial direction of the breakthrough 82a which it is tubular and is penetrated to an axial direction from that tip to an end, and the breakthrough 82a in parallel, and two or more slot slots 82b of the length which does not arrive at an end are formed. In the peripheral part of the collet 82, the thin tapered surface 82c is established in the axial direction tip part at last, and 82 d of screw threads are formed in the axial direction end piece.
[0004]the hollow in which the collet accommodation material 86 accommodates the collet 82 -- it being tubular and, The breakthrough 86a penetrated to an axial direction is formed to the field which counters the byte 94 from the field which counters the principal axis 92, and the inner periphery 86b of the breakthrough 86a by the side of the field which counters the byte 94 is formed so that it may correspond to the thin tapered surface 82c in the end of the collet 82. On the other hand, the inner periphery of the breakthrough 86a by the side of the field which counters the principal axis 92 is formed so that insertion of the clamping screw 84 is possible. Mounting and fixing of this collet accommodation material 86 is carried out to the frame 88.
[0005]The breakthrough 84a which can insert in the cylindrical raw material 90 is formed, and the female screw formed so that it might screw in 82 d of screw threads of the collet 82 is formed in the clamping screw 84.
[0006]In the guide pin bushing 80, the collet 82 is accommodated in the collet accommodation material 86, and the clamping screw 84 engages with the breakthrough 86a of the collet accommodation material 86 from the principal-axis 92 side, and the clamping screw 84 is screwing in 82 d of screw threads of the axial direction end piece of the collet 82. This guide pin

bushing 80 performs caliber regulation for the clamping screw 84 ******** or by loosening, and it is constituted so that it can support with the inside diameter which set the cylindrical raw material 90 by that outer diameter. That is, ******** and the collet 82 are drawn into the collet accommodation material 86, and it is radially pressurized from the inner periphery of the collet accommodation material 86, and the breakthrough 82a of the collet 82 reduces the diameter of the clamping screw 84. On the other hand, if the clamping screw 84 is loosened, the collet 82 moves to an axial direction within the collet accommodation material 86 with own elasticity, and the radial application of pressure to the collet 82 is eased, and it is constituted so that the breakthrough 82a of the collet 82 may expand the diameter.

[0007]

[Problem(s) to be Solved by the Invention]However, although the slot slot 82b of the collet 82 is extended towards the end from the axial direction tip of the collet 82, Since an end is not arrived at and it is constituted so that the tip part of the collet 82 may be radially displaced by making the end part of the slot slot 82b into a fulcrum if the collet 82 is pressurized radially, There is a problem that it is difficult to constitute the inner skin of the collet 82 evenly in an axial direction, and to enlarge a bearing area, and it difficult for the cylindrical raw material 90 to be easy being supported only near the tip part of the collet 82, and to control the deflection of the cylindrical raw material 90.

[0008]In order to constitute the inside diameter of the collet 82 within a certain amount of limits almost uniformly in an axial direction, Since it is difficult to reduce the length of the axial direction of guide pin bushing and hard to reduce the distance of a principal axis and a processing part in order to have to form the collet 82 in an axial direction for a long time so that a slot can be formed deeply, There is a problem that it is difficult to shorten a surplus material's length, and the utilization efficiency of material is bad.

[0009]Since the clamping screw 84 is arranged in the field of the guide pin bushing 80 which counters the principal axis 92, in order to adjust the caliber of the collet 82, a hand must be turned from the byte 94 side and the clamping screw 84 must be rotated between the guide pin bushing 80 and the principal axis 92. Therefore, there is a problem that the operativity of the clamping screw 84 is bad.

[0010]Then, this invention solves the above-mentioned problem, the technical problem can be short formed in an axial direction, and it can fully control the deflection of a cylindrical raw material, and there is the operativity of a clamping screw in providing guide pin bushing using a good collet and this.

[0011]

[Means for Solving the Problem]The 1st slot slot which a collet of this invention is a collet of the shape of a hollow pipe which has a thin tapered surface at last in a peripheral part in order to solve an aforementioned problem, and is extended towards an end from an axial direction tip, and the 2nd slot slot extended towards a tip from an axial direction end are formed.

[0012]Since the 1st slot slot extended towards an end from an axial direction tip of a hollow pipe-like collet and the 2nd slot slot extended towards a tip from an axial direction end are formed according to this invention, any by the side of a tip of a collet, and an end -- although -- since it will be constituted so that elastic displacement can be carried out, the diameter of both by the side of a tip of a collet and an end can be made to reduce by pressurizing a collet radially Therefore, while being able to support a work now at least at two places of an axial direction compared with the former and being able to control deflection of a work, the necessity of making the length of an axial direction of a collet increasing is also reduced.

[0013]In this invention, it is preferred that two or more said 1st slot slots and said 2nd slot slots are formed, respectively. Since two or more said 1st slot slots and said 2nd slot slots are formed, respectively according to this invention, an inside diameter of a breakthrough of a collet can be uniformly changed by the circumference direction. In this invention, it is preferred that said 1st slot slot and said 2nd slot slot are formed in a hoop direction by turns with an interval. Since said 1st slot slot and said 2nd slot slot are formed in a hoop direction by turns with an interval according to this invention, an inside diameter by the side of an axial direction tip of a breakthrough of a collet and an end can be changed with sufficient balance.
[0014]In this invention, it is preferred that a concave of a letter of the circumference is formed in a thin tapered surface said end. When it is constituted so that process tolerance of a thin tapered surface and a pressurization face which pressurizes this may be bad in the end of said collet and a thin tapered surface and a pressurization face may contact only at one place of an axial direction said end, An inside diameter of a breakthrough of a collet will also be easily inclined toward an axial direction with a bias of a contact site of a thin tapered surface and a pressurization face at last. However, a thin tapered surface and said pressurization face can be changed said end into the state where it contacted at two places of an axial direction in axial direction both sides of a concave, by forming the above-mentioned concave in this invention also in the above situations. Therefore, a bias of an axial direction in a breakthrough inside diameter of said collet which originates in a bias of a contact site of a thin tapered surface and a pressurization face at last can be reduced.
[0015]Guide pin bushing of this invention is provided with the following.
A collet given in any 1 paragraph from claim 1 to claim 4.
Collet accommodation material which has an inner periphery corresponding to a thin tapered surface said end.
A nut with a bundle which has a contact surface which contacts an axial direction apical surface of said collet, and is screwed in a peripheral part of said collet accommodation material.

[0016]According to this invention, since an axial direction apical surface of a collet is controllable according to that contact surface by adjusting screwing depth to collet accommodation material of a nut with a bundle, caliber adjustment of collet accommodation material can be performed. Since a nut with a bundle will be arranged at the tip side of a collet at this time, When guide pin bushing has been arranged with a posture which turned the tip side of a collet to a processing part (a tip side of a collet is easier to heighten bearing power over a work since the outer diameter is larger than the end side.), Since it becomes unnecessary to edit between a principal axis and guide pin bushing like before in order to operate a nut with a bundle, operativity can be raised.
[0017]In order to shorten distance of a supporter tip of a work and a processing part by a collet here, it is desirable to provide a lobe in the center of a tip of said collet, and to provide a possible opening of making this lobe insert in in said nut with a bundle. Since distance of a supporter tip and a processing part can be shortened even if a nut with a bundle exists if it does in this way, deformation of a work resulting from a processing pressure can be reduced, and process tolerance can be raised.
[0018]In this invention, it is preferred to have a pressing means which presses said collet to the axial direction tip side. Since said collet is pressed by said pressing means at the axial direction tip side according to this means, if said nut with a bundle is fastened, thrust of said pressing means can be resisted and said collet can be moved to the axial direction end side. On the other

hand, if said nut with a bundle is loosened, said collet can be moved to the axial direction tip side by thrust of said pressing means. Therefore, caliber regulation of said collet can be ensured.
[0019]As for said pressing means, in this invention, it is preferred to have an elastic member arranged at the axial direction end side of said collet and a supporter which supports this elastic member from behind. According to this invention, since said pressing means comprises an elastic member and a support member which supports this elastic member from behind, said collet can be certainly pressed to the axial direction tip side with simple composition. Here, although said elastic members are a spring, rubber, etc., it is desirable that it is especially a coil spring.
[0020]
[Embodiment of the Invention]The embodiment of the collet which starts this invention below is described in detail.
[0021][A 1st embodiment] With reference to drawing 1, the collet of a 1st embodiment in this invention is explained to the beginning. (a) is an outline perspective view showing the collet of a 1st embodiment concerning this invention. (b) is an outline top view of the collet of a 1st embodiment. (c) is an outline sectional view showing typically the state where the flat surface b and flat-surface b' cut the collet of a 1st embodiment, shows the deformation direction of the collet by the radial application of pressure P by Q, and it shows the deformed geometry of a collet with a dashed line.
[0022]The collet 10 of a 1st embodiment concerning this invention is a fastening part article which grasps the tool like a cylindrical raw material or an end mill, or a drill. This collet 10 consists of an elastic substance like metal, and is formed in the shape of a hollow pipe. The breakthrough 120 is formed in the collet 10, and the thin tapered surface 140 is formed in the peripheral part of the collet 10 at last.
[0023]The breakthrough 120 is penetrated to the axial direction from the tip 16 of the collet 10 to the end 18, and the inside diameter of the breakthrough 120 is formed so that it may become almost the same from the tip 16 of the collet 10 to the end 18. The surface of the inner periphery of the collet 10 which forms the breakthrough 120 is formed in the smooth side so that a cylindrical raw material etc. may become slidable.
[0024]The thin tapered surface 140 is formed in the end of the collet 10 so that the outer diameter of collet 10 peripheral part may decrease gradually towards the end 18 from the axial direction tip 16 of the collet 10. Two or more two kinds of slot slots, the 1st slot slot 10a and the 2nd slot slot 10b, are formed in the collet 10, respectively by various publicly known methods of having used a metal slitting saw, a screw slotting cutter, a braid (dicing), a wire, etc., such as mechanical processing or an electron discharge method. Here, the 1st slot slot 10a and the 2nd slot slot 10b set an interval to the hoop direction of the collet 10, and are formed in it by turns.
[0025]Here, the 1st slot slot 10a is extended towards the end 18 from the axial direction tip 16 of the collet 10, has the length which does not arrive at the axial direction end 18 of the collet 10, and it is deeply cut radially from the peripheral part of the collet 10 to the breakthrough 120. On the other hand, the 2nd slot slot 10b is extended towards the tip 16 from the axial direction end 18 of the collet 10, has the length which does not reach at the tip 16 of an axial direction of the collet 10, and it is deeply cut radially from the peripheral part of the collet 10 to the breakthrough 120.Therefore, the axial direction tip 16 of the collet 10 is divided into the hoop direction by the 1st slot slot 10a, and the axial direction end 18 of the collet 10 is divided into the hoop direction by the 2nd slot slot 10b.
[0026]In the axial direction apical surface of the collet 10, it is formed so that the center portion

162 may project in an axial direction to the edge part 164, and the level difference 166 of the letter of the circumference is formed between the center portion 162 and the edge part 164.
[0027]As a dashed dotted line shows to drawing 1 (b), the piece 10A of the 1st slot is formed between the two adjoining 1st slot slots 10a and 10a, and the 2nd slot slot 10b is formed in the center of this piece 10A of the 1st slot. On the other hand, as a two-dot chain line shows to drawing 1 (b), the piece 10B of the 2nd slot is formed between the two adjoining 2nd slot slots 10b and 10b, and the 1st slot slot 10a is formed in the center of the piece 10B of the 2nd slot.
[0028]As shown in drawing 1 (c), application of pressure of the radial direction P forms the piece 10A of the 1st slot so that elastic deformation may be carried out in the direction Q which reduces the diameter of the breakthrough 120 by the side of the axial direction tip 16 of the collet 10. On the other hand, application of pressure of the radial direction P forms the piece 10B of the 2nd slot so that elastic deformation may be carried out in the direction Q which reduces the diameter of the breakthrough 120 by the side of the axial direction end 18 of the collet 10. Therefore, when welding pressure is received in the taper tapered surface 140, the both sides of the tip 16 of the collet 10 and the end 18 reduce the diameter, It is possible to also make an axial direction reduce the diameter of the collet 10 whole almost uniformly depending on the formation modes (for example, the number of slots, the depth of an axial direction, etc.) of the above-mentioned 1st slot slot 10a and the 2nd slot slot 10b.
[0029]In this 1st embodiment, the 1st slot slot 10a is extended towards the end 18 from the axial direction tip 16 of the collet 10, and. Since the 2nd slot slot 10b is extended towards the tip 16 from the axial direction end 18 of the collet 10, The diameter of all by the side of the axial direction tip 16 of the breakthrough 120 of the collet 10 and the axial direction end 18 can be made to reduce, and a cylindrical raw material can be supported at at least two places of an axial direction, or can be grasped. Therefore, when using for guide pin bushing, the deflection of a cylindrical raw material can be controlled compared with the former.
[0030]Since it can support or grasp as mentioned above at at least two places of an axial direction, Since it becomes unnecessary to form a collet for a long time in order to lengthen the support length or grasping length of an axial direction like before, it becomes possible to shorten the length of the axial direction of the collet 10 compared with the former.
[0031][A 2nd embodiment] Next, with reference to drawing 2, the collet of a 2nd embodiment in this invention is explained. In this embodiment, that explanation is omitted about a 1st embodiment and identical parts. The collet 20 is formed in the shape of a hollow pipe with the same construction material as the collet 10 of a 1st embodiment, and the thin tapered surface 140 is established in the peripheral part at last. Although the thin tapered surface 140 is evenly formed at last in a 1st embodiment, as shown in drawing 2 (a), the concave 140a of the letter of the circumference is formed in the thin tapered surface 140 at last by this 2nd embodiment.
[0032]Here, the concave 140a is formed in the middle of the axial direction of the thin tapered surface 140 at last. In particular, the thing of the axial direction of the thin tapered surface 140 for which the concave 140a is mostly formed in the mid-position is preferred at last. What is necessary is just to be in the state which inserted the cylindrical raw material in the breakthrough 120 of the collet 20, and to pressurize the thin tapered surface 140 radially first, in the end of the collet 20, in order to support or grasp a cylindrical raw material by the collet 20 formed as mentioned above. this time -- any by the side of the axial direction tip 16 of the breakthrough 120 of the collet 20, and the end 18 -- although -- a cylindrical raw material can be supported or grasped by reducing the diameter at at least two places of an axial direction.
[0033]In a 1st embodiment of the above, the case where both contact mutually in the end of a

collet only at one place of an axial direction according to the working error of a thin tapered surface and the pressurization face which pressurizes this can be considered. In this case, it becomes easy to produce the bias of an axial direction in the inside diameter of a collet -- according to the position of the only contact site, in the tip side of a collet, an inside diameter becomes small rather than the end side, or, in the end side, an inside diameter becomes small rather than the tip side conversely.

[0034]Since the concave 140a of the letter of the circumference is formed in the thin tapered surface 140 in this 2nd embodiment in the end of the collet 20 when pressurizing the thin tapered surface 140 radially at last in the pressurization face 240 as shown in drawing 2 (c), Since it can constitute so that the curve vertex part of the pressurization face 240 may go into the concave 140a though the pressurization face 240 which is the inner skin of the collet member holding 200 is curving radially, The thin tapered surface 140 and the pressurization face 240 can be made to contact at two places [ two ] of an axial direction, i.e., the both sides of the concave 140a, in the end of the collet 20. Therefore, since the collet 20 will be pressurized at two places of an axial direction, it can reduce the bias of the inside diameter of the collet 20 by the working error of the thin tapered surface 140 and the pressurization face 240 at last.

[0035][A 3rd embodiment] Next, with reference to drawing 3 and drawing 4, guide pin bushing of a 3rd embodiment in this invention is explained. Drawing 3 is an outline exploded perspective view showing guide pin bushing of a 3rd embodiment concerning this invention. Drawing 4 is outline drawing of longitudinal section showing guide pin bushing of a 3rd embodiment concerning this invention. The guide pin bushing 100 is attached near the edged tool of the machine tool like the automatic lathe cut while rotating a cylindrical raw material, and it has it in order to prevent the shaft orientations of a cylindrical raw material from swaying. The guide pin bushing 100 comprises the nut 30 with a bundle, the collet 10, the accommodation material 40, the spring 50, and the rear lid 60. Here, the collet 10 of this 3rd embodiment is the same as that of a 1st embodiment, and omits that explanation.

[0036]The accommodation material 40 comprises the rear lid accommodation portion 42 of approximately rectangular parallelepiped shape, and the hollow pipe-like collet accommodation portion 44. The collet accommodation portion 44 is formed in the center portion of the rear lid accommodation portion 42 at one, and the breakthrough 46 which penetrates the collet accommodation portion 44 and the rear lid accommodation portion 42 to an axial direction is formed. A part of breakthrough 46 which is inside the collet accommodation portion 44 is provided with the pressurization face 46a which has the inner surface shape of conical surface shape. The collet 10 is accommodated in the collet accommodation portion 44, and it is constituted so that the above-mentioned pressurization face 46a of the collet accommodation portion 44 may be close to the thin tapered surface 140 in the end of the collet 10. The screw thread is formed in the peripheral part 44a of the collet accommodation portion 44.

[0037]The nut 30 with a bundle is formed so that the inner periphery 30a may screw in the screw thread 44a of the collet accommodation portion 44, and the cover plate part 32 is formed at the tip of an axial direction. This cover plate part 32 is formed so that it may contact at the tip of an axial direction of the collet 10, and the breakthrough 36 is formed in the center portion of the cover plate part 32. This breakthrough 36 has the aperture shape which can insert the center portion 162 which projects from the axial direction apical surface of the collet 10. Existence of this center portion 162 enables it to support a work (cylindrical raw material) at the place nearer to a processing part.

[0038]In the example of a graphic display, the spring 50 is a coil spring, and it is arranged so that

the axial direction end of the collet 10 may be contacted. Here, the inside of the spring 50 is formed so that insertion of a cylindrical raw material is possible, and the inside diameter of the spring 50 is larger than the inside diameter of the breakthrough 120 of the collet 10, and the outer diameter of the spring 50 is formed smaller than the outer diameter of the axial direction end of the collet 10. The rear lid 60 is approximately rectangular parallelepiped shape, and the crevice 60a in which the spring 50 can be accommodated is established in the center portion. The breakthrough 62 is formed in the center of this crevice 60a. This breakthrough 62 is constituted so that insertion of a cylindrical raw material is possible.

[0039]As shown in drawing 4, the guide pin bushing 100, First, the rear lid 60 which accommodated the spring 50 in the crevice 60a is made to fit into the rear lid accommodation portion 42 of the accommodation material 40, the accommodation material 40 is connected with the rear lid 60 with a bolt or a screw thread, the collet 10 is introduced into the collet accommodation portion 44 of the accommodation material 40 after that, and, finally the nut 30 with a bundle is screwed in the peripheral part 44a of the collet accommodation portion 44 -- as -- ******** -- it is assembled by things. In this assembly state, the breakthrough 36 of the nut 30 with a bundle, the breakthrough 120 of the collet 10, and the breakthrough 62 of the rear lid 60 are arranged on the same axis.

[0040]The collet 10 is pinched with the nut 30 with a bundle, and the spring 50 from the both sides of the axial direction, and the collet 10 is pressed by the elasticity of the spring 50 towards the axial direction tip side here, and. Contact support of the axial direction tip 16 of the collet 10 is carried out by the inner surface of the cover plate part 32 of the nut 30 with a bundle. While constituting the inner surface of the cover plate part 32 in parallel to a diameter direction, here, Since it shows around by the inner surface of the cover plate part 32 in a diameter direction when the collet 10 is pressurized by the above-mentioned pressurization face 36a by constituting in parallel the end face which contacts the cover plate part 32 in the tip 16 of the collet 10 to a diameter direction, It becomes possible to change the collet 10 into high degree of accuracy more.

[0041]The automatic lathe 300 shown in drawing 5 is equipped with the above-mentioned guide pin bushing 100, for example. The principal axis 92 which this automatic lathe 300 grasps the cylindrical raw material 90 which is a work, and rotates, It has the byte 94 attached to the tool post which is not illustrated, the principal-axis delivery part 96 for making an axial direction carry out reciprocation moving of the principal axis 92, and the principal-axis rotary motor 98 which rotates the principal axis 92, and the principal axis 92 and the guide pin bushing 100 are arranged on the same axis. Where the principal axis 92 is grasped [ the cylindrical raw material 90 ], while rotating with the principal-axis rotary motor 98, the cylindrical raw material 90 is processed by the byte 94 by moving forward to an axial direction toward the guide pin bushing 100 by the principal-axis delivery part 96. If the principal axis 92 arrives at the limit position of the moving stroke, the cylindrical raw material 90 is once released and it retreats to axial direction back, and after grasping the cylindrical raw material 90 again, advance will be started, and processing will be again performed like the above.

[0042]In processing the cylindrical raw material 90 with the above-mentioned automatic lathe 300, First, while the cylindrical raw material 90 sent from the principal axis 94 can insert in the guide pin bushing 100, The nut 30 with a bundle is adjusted so that the inside diameter of the breakthrough 120 of the collet 10 of the guide pin bushing 100 may be doubled with the outer diameter of the cylindrical raw material 90 ******** or by loosening from the byte 94 side, so that the cylindrical raw material 90 may sway and process tolerance may not be worsened during

processing.
[0043]In order that ******** and the spring 50 may contract the clamping screw 30 and the collet 10 may move to the axial direction end side within the collet accommodation portion 44 on the occasion of caliber regulation of this guide pin bushing 100, it is pressurized by the pressurization face 46a and the diameter is reduced radially. On the other hand, if the clamping screw 30 is loosened, in order that the spring 50 may develop and the collet 10 may move to the axial direction tip side out of the collet accommodation portion 44, the welding pressure by the pressurization face 46a is released, and the collet 10 expands the diameter radially.
[0044]Since the guide pin bushing 100 has the collet 10 whose diameter all by the side of the axial direction tip of the breakthrough 120 and an end can make reduce in this 3rd embodiment, Since the cylindrical raw material 90 can be supported at at least two places of an axial direction, can prevent the deflection of the cylindrical raw material 90, and. Since the length of the axial direction of the collet 10 can be shortened without worsening the support characteristic to the cylindrical raw material 90, compared with the former, the guide pin bushing 100 can be short constituted in an axial direction. Since the nut 30 with a bundle is arranged at the axial direction tip side of the collet 10, caliber regulation of the collet 10 can be easily performed compared with the former.
[0045]Although the collet 10 of a 1st embodiment was used for the guide pin bushing 100 of a 3rd embodiment, a collet is not limited to this and may use the collet 20 of a 2nd embodiment.
[0046]As for the collet of this invention, and guide pin bushing using this, it is needless to say that change can be variously added within limits which are not limited only to the above-mentioned example of a graphic display, and do not deviate from the gist of this invention.
[0047]
[Effect of the Invention]As mentioned above, since the 1st slot slot extended towards an end from an axial direction tip and the 2nd slot slot extended towards a tip from an axial direction end were formed in the collet according to this invention as explained, While being able to control the deflection of a cylindrical raw material more, the length of the axial direction of a collet and guide pin bushing can be shortened.